IN THE CLAIMS

<u>Amendments to the Claims:</u>

Please amend Claim 1.

This listing of claims will replace all prior versions, and listing of claims in the application.

Listing of Claims:

Claim 1 (currently amended): Method of determining the velocity v and anellipticity η parameters for processing seismic traces obtained from seismic receivers in a common midpoint (CMP) gather including an anelliptic NMO correction, comprising:

- a preliminary step to define a plurality of nodes (dtn, τ_0), the said nodes being indicative of parameters dtn and τ_0 representing the NMO correction for the maximum offset and the zero offset travel time in hyperbolic coordinates, the said preliminary step being followed by

- for each node (dtn, τ_0) defined in the preliminary step, the following steps:

- for static NMO correction of traces in the CMP gather as a function of the values of the said parameters dtn, τ_0 at the node considered, and

- for calculating the semblance function associated with the said NMO correction for the node considered; and

- for each picked time t_0, a step including determination of the maximum semblance node (dtn (t_0), τ_0 (t_0)),

- a step to convert the dtn (t_0) and τ_0 (t_0) parameters so as to obtain the velocity V (t_0) and anellepticity η (t_0) laws

and a step of processing the seismic traces in view of the velocity $V(t_0)$ and anellepticity $\eta\,(t_0)$ laws.

Claim 2 (original): Method according to claim 1, wherein the nodes are defined during the preliminary step in an analysis volume (dtn, τ_O, t_0)determined by minimum and maximum values respectively $[dtn_{min}, dtn_{max}]$ $[\tau_{omin}, \tau_{omax}]$ and $[t_{omin}, t_{omax}]$ of the dtn, τ_o, and t_0 parameters.

Claim 3 (original): Method according to claim 2, wherein, during the preliminary step, a corridor [dtn_{min} (t_0), dtn_{max} (t_0)], [$\tau_{O\,max}(t_0)$, $\tau_O max$, (t_0)] for max changing dtn and τ_0 parameters is delimited inside the analysis volume as a function of plausible velocity V and anellipticity η values, the nodes (dtn, τ_0) defined for applying the NMO correction being then located along the corridor thus delimited.

Claim 4 (previously presented): Method according to claim 1, further comprising, for each node (dtn, τ_0), a stacking step of the corrected seismic traces, following the semblance function calculation step.

Claim 5 (original): Method according to claim 4, wherein the stacking of corrected traces is done using only near offset traces.

Claim 6 (previously presented): Method according to claim 4, further comprising for each picked time, and following the step for determining the maximum semblance node, a step of checking that values dtn and τ_0 of the maximum semblance node correspond to a stacking extreme value for the same values dtn and τ_0.

Claim 7 (previously presented): Method according to claim 1, further comprising a step of selecting and adjusting the pickings obtained, following the step implemented for determining the maximum semblance node (dtn (t_0), τ_0 (t_0))for each picked time t_0, before the conversion step.

Claim 8 (original): Method according to claim 7, wherein the said step of selecting and adjusting the pickings comprises a step of only retaining pickings dtn and τ_O for which time to the highest semblance pickings is greater than a predefined value.

Claim 9 (original): Method according to claim 8, wherein the said step of selecting and adjusting the pickings also comprises a step for adjusting the retained pickings dtn and τ_O by parabolic interpolations using values about the said picked values.

Claim 10 (original): Method according to claim 9, wherein the said step of selecting and adjusting pickings also comprises a step of eliminating retained and adjusted pickings dtn and τ_O when it is impossible to calculate the Dix interval velocities between the picking considered and higher semblance pickings.

Claim 11 (previously presented): Method according to claim 1, wherein the processing applied to seismic traces is an NMO correction process implementing a static correction $CORR_{NMO}$.

Claim 12 (original): Method according to claim 11, wherein, during the preliminary step, the NMO corrections $CORR_{NMO}$ are calculated for all nodes (dtn, τ_O) including in the analysis volume and all offsets of processed seismic traces.

Claim 13 (original): Method according to claim 12, wherein the NMO correction carried out for each node (dtn, τ_O), consists of applying NMO corrections $CORR_{NMO}$ calculated during the preliminary step.

Claim 14 (previously presented): Method according to claim 11, wherein for a given (dtn, τ_O) pair, the static NMO correction $CORR_{NMO}$ of a seismic trace with offset x is carried out according to the following equation:

$CORR_{NMO}(x) = -\tau_O + \sqrt{\tau_0^2 + \frac{dtn\,(dtn + 2\tau_0)}{x_{max}^2}\,x^2}$ in which X_{max} represents the maximum offset in the CMP gather.

Claim 15-19 (withdrawn)

Claim 20 (previously presented): Method according to claim 14, wherein, during the final conversion step, the parameters dtn (t_0), and (τ_0) are converted to the velocity law v (t_0) according to the following equation:

$$V = \frac{x_{max}}{\sqrt{dtn(dtn + 2\tau_0)\frac{t_0}{\tau_0}}}$$

Claim 21 (previously presented): Method according to claim 14, wherein, during the final conversion step, the parameter τ_0 (t_0) is converted to the anellepticity η (t_0) law according to

$$\eta = \frac{1}{8}\left(\frac{t_0}{\tau_0} - 1\right)$$

Claim 22 (previously amended): Method according to claim 20, wherein parameter dtn is defined with respect to the velocity v and anellepticity η according to the following equation:

$$\mathrm{dtn} = \frac{8\eta}{1+8\eta}t_0 + \sqrt{\left(\frac{t_0}{1+8\eta}\right)^2 + \frac{x_{max}^2}{(1+8\eta)V_2}}$$

Claim 23 (original): Method according to claim 21, wherein parameter τ_0 is defined according to anellepticity η according to the following equation:

$$\tau_0 = \frac{t_0}{1+8\eta}$$

Claim 24 (withdrawn)

Claim 25 (original): Method according to claim 2, further comprising, for each node (dtn, τ_0), a stacking step of the corrected seismic traces, following the semblance function calculation step.

Claim 26 (original): Method according to claim 25, wherein the stacking of corrected traces is done using only near offset traces.

Claim 27 (original): Method according to claim 25, further comprising for each picked time, and following the step for determining the maximum semblance node, a step of checking that values dtn and τ_0 of the maximum semblance node correspond to a stacking extreme value for the same values dtn and τ_0.

Claim 28 (original): Method according to claim 2, further comprising a step of selecting and adjusting the pickings obtained, following the step implemented for determining the maximum semblance node (dtn (t_0), τ_0 (t_0)) for each picked time τ_0, before the conversion step.

Claim 29 (original): Method according to claim 28, wherein the said step of selecting and adjusting the pickings comprises a step of only retaining pickings dtn and τ_0 for which time to the highest semblance pickings is greater than a predefined value.

Claim 30 (original): Method according to claim 29, wherein the said step of selecting and adjusting the pickings also comprises a step for adjusting the retained pickings dtn and τ_0 by parabolic interpolations using values about the said picked values.

Claim 31 (original): Method according to claim 30, wherein the said step of selecting and adjusting pickings also comprises a step of eliminating retained and adjusted pickings dtn and τ_0 when it is impossible to calculate the Dix interval velocities between the picking considered and higher semblance pickings.

Claim 32 (original): Method according to claim 2, wherein the processing applied to seismic traces is an NMO correction process implementing a static correction $CORR_{NMO}$.

Claim 33 (original): Method according to claim 32, wherein, during the preliminary step, the NMO corrections $CORR_{NMO}$ are calculated for all nodes (dtn, τ_0) including in the analysis volume and all offsets of processed seismic traces.

Claim 34 (original): Method according to claim 32, wherein the NMO correction carried out for each node (dtn, τ_0), consists of applying NMO corrections $CORR_{NMO}$ calculated during the preliminary step.

Claim 35 (original): Method according to claim 32, wherein for a given (dtn, τ_0) pair, the static NMO correction $CORR_{NMO}$ of a seismic trace with offset x is carried out according to the following equation:

$$CORR_{NMO}(x) = - t_0 + \sqrt{\tau_0^2 + \frac{dtn\left(dtn + 2\tau_0\right)}{x_{max}^2}\, x^2}$$ in which X_{max} represents the maximum offset in the CMP gather.

Claim 36-39 (withdrawn)

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Claim 40 (currently amended): Method according to claim ~~36~~ 2, wherein the processing applied to seismic traces is a PSTM migration using a static NMO correction $CORR_{PSTM}$, and wherein, for a given pair (dtn and τ_0), the static NMO correction $CORR_{PSTM}$ is carried out according to the following equation:

$$CORR_{PSTM}(x) = -\ t_0 + \sqrt{\frac{\tau_0^2}{4} + \frac{dtn\ (dtn + 2\tau_0)\ (x - x + h)^2}{x^2_{max}}} + \sqrt{\frac{\tau_0^2}{4}} +$$

$$\frac{dtn\ (dtn + 2\tau_0)(x - x - h)^2}{x^2_{max}}$$

where:

- x_m represents the coordinates of the midpoints,

- $x - x_m$ represents the migration aperture PSTM,

- h is the half source — receiver offset,

- xmax is the maximum offset and aperture of the migration.

Claim 41 (original): Method according to claim 35, wherein, during the final conversion step, the parameters dtn (t_o) and (τ_0) are converted to the velocity law v (t_o)according to the following equation: $V = \dfrac{x_{\max}}{\sqrt{dtn(dtn + 2\tau_O)\dfrac{t_O}{\tau_O}}}$

Claim 42 (original): Method according to claim 35, wherein, during the final conversion step, the parameter τ_0 $(t_o)$is converted to the anellepticity π (t_o) law according to

$\eta = \dfrac{1}{8}\left(\dfrac{t_O}{\tau_O} - 1\right)$

Claim 43 (original): Method according to claim 41, wherein parameter dtn is defined with respect to the velocity v and anellepticity η according to the following equation:

$$\mathrm{dtn} = \frac{8\eta}{1+8\eta}t_o + \sqrt{\left(\frac{t_o}{1+8\eta}\right)^2 + \frac{x_{\max}{}^2}{(1+8\eta)V_2}}$$

Claim 44 (original): Method according to claim 42, wherein parameter τ_0 is defined according to anellepticity η according to the following equation:

$$\tau_O = \frac{t_O}{1+8\eta}$$

Claim 45 (original): Method according to claim 3, further comprising, for each node (dtn, τ_0), a stacking step of the corrected seismic traces, following the semblance function calculation step.

Claim 46 (original): Method according to claim 45, wherein the stacking of corrected traces is done using only near offset traces.

Claim 47 (original): Method according to claim 45, further comprising for each picked time, and following the step for determining the maximum semblance node, a step of checking that values dtn and τ_0 of the maximum semblance node correspond to a stacking extreme value for the same values dtn and τ_0.

Claim 48 (original): Method according to claim 3, further comprising a step of selecting and adjusting the pickings obtained, following the step implemented for determining the maximum semblance node $(\mathrm{dtn}(t_0), \tau_0(t_0))$ for each picked time t_0, before the conversion step.

Claim 49 (original): Method according to claim 48, wherein the said step of selecting and adjusting the pickings comprises a step of only retaining pickings dtn and τ_0 for which time to the highest semblance pickings is greater than a predefined value.

Claim 50 (original): Method according to claim 49, wherein the said step of selecting and adjusting the pickings also comprises a step for adjusting the retained pickings dtn and τ_0 by parabolic interpolations using values about the said picked values.

Claim 51 (original): Method according to claim 50, wherein the said step of selecting and adjusting pickings also comprises a step of eliminating retained and adjusted pickings dtn and τ_0 when it is impossible to calculate the Dix interval velocities between the picking considered and higher semblance pickings.